

Question: Is there an optimum stack height?

Answer: Yes, there is.

Let n represent the total number of containers in our scoring area. For the sake of our calculations, this is a constant value.

Let x represent the number of containers that we use to make our stack.

Then $n-x$ equals the number of containers in the scoring area not used in building the stack.

Our score, excluding "king-of-the-hill" points, can then be calculated by multiplying our stack height by the number of containers not used in building our stack. Creating a mathematical expression for this we get:

$$\text{score} = x(n-x)$$

$$= nx - x^2$$

$$= -x^2 + nx$$

So the (oft noted) quadratic coefficients are:

$$a = -1$$

b = number of containers in our alliance's scoring area

c = number of "king-of-the-hill" points

Calculus Alert

Now to optimize our score we take the derivative of the above equation...

$$\text{score} = -x^2 + nx$$

$$\text{score}' = -2x + n$$

...and then solve for x when score' is held at zero.

$$-2x + n = 0$$

$$-2x = -n$$

$$x = -n/-2$$

$$x = n/2$$

What this expression says is that we will get the maximum score if we use half of the available containers in the scoring area to build our stack.

Homework question:

This falls apart if n is odd. After all, how do you stack half of a container? So my question is simply: Given an odd number of containers in your scoring area, do you put that last, odd-numbered container on the stack or not?

Hint:

Well, first you might just make a table that relates the two possible scores for each case ($n = 3, 5, 7$, etc). Then if you're still curious, you might want to do a mathematical proof to convince yourself that this still holds true for a million and one containers in the scoring area.

-Kevin Watson